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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/902,633	07/12/2001	Shigeori Takenaka	026350-060	2719

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EXAMINER	
CLOW, LORI A	

ART UNIT	PAPER NUMBER
1631	

DATE MAILED: 10/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/902,633	TAKENAKA, SHIGEORI	
	Examiner	Art Unit	
	Lori A. Clow, Ph.D.	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *16-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *16-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Applicants' arguments, filed 21 July 2004, have been fully considered. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn. The following rejections and/or objections are either reiterated or newly applied. They constitute the complete set presently being applied to the instant application.

Claims 16-19 are currently pending.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 16-19 remain rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The rejection is re-iterated below for Applicant's convenience.

In *In re Wands* (8 USPQ2d 1400 (CAFC 1988)) the CAFC considered the issue of enablement in molecular biology. The CAFC summarized eight factors to be considered in a determination of "undue experimentation". These factors include: (a) the quantity of experimentation necessary; (b) the amount of direction or guidance presented; (c) the presence or absence of working examples; (d) the nature of the invention; (e) the state of the prior art; (f) the relative skill of those in the art; (g) the predictability of the art and (h) the; breadth of the claims.

In considering the factors for the instant claims:

a) In order to practice the claimed invention one of skill in the art must be able to detect a highly ordered structural site of a nucleic acid of a gene. For the reasons discussed below, this constitutes undue experimentation.

b) and c) The specification provides examples for synthesis of a cyclic ligand (pages 7-8) and the detection of a **specific** hairpin structure composed of GCGAAAAACGC (page 9). The hairpin structure DNA was hybridized with an oligonucleotide complementary to the hairpin DNA. The results showed that even when a double stranded nucleic acid site coexists with a specific single stranded nucleic acid site, the specific single stranded site may be detected (page 10). However, the claims are drawn to a method to detect a highly ordered structural site of **any** nucleic acid. The method could potentially detect any double-stranded DNA or any RNA. The specification does not provide guidance on how to distinguish between double stranded DNA, "normal" single stranded DNA, and a "highly ordered" structural site of a single stranded nucleic acid. There is no explanation in the specification of the parameters necessary to render a nucleic acid "highly ordered". Furthermore, how might the method and probe distinguish between DNA and RNA? Without such guidance in the specification one of skill in the art would not know how to practice the invention such that a highly ordered structure of a nucleic acid of a gene be detected. The invention is not enabled.

d) The invention is drawn to a method and device to detect a highly ordered structure of a nucleic acid of a gene.

e) and g) The prior art teaches probe DNA sensors consisting of oligonucleotide-modified gold electrodes and ferrocenyl naphthalene diimide. The probe DNA on the electrode undergoes

hybridization with a sample DNA having the complementary sequence, and the diimide intercalates into the resulting double stranded DNA specifically (Takenaka et al. Chemisrty Letters, 1998, pages 989-990, PTO-1449). The prior art does not teach a cyclic ligand, as in the present invention.

f) The skill of those in the art of molecular biology is high.

h) The preamble narrows the claims to be drawn to the detection of a "highly ordered" nucleic acid; however, the claimed steps and probe are broader as they may be used to detect ANY nucleic acid. There is no guidance on how to distinguish a "highly ordered" structure of a single stranded DNA with any other type of nucleic acid.

The skilled practitioner would first turn to the instant specification for guidance to practice methods of detecting highly ordered structures. However, the instant specification does not provide specific guidance to practice these embodiments. As such, the skilled practitioner would turn to the prior art for such guidance, however, the prior art shows that such detection methods employing a linear probe work for double stranded DNA. There is nothing in the prior art regarding cyclic probes as in the instant invention. Finally, said practitioner would turn to trial and error experimentation to determine whether said method and probe is capable of distinguishing between double stranded DNA, single stranded DNA and highly ordered single stranded DNA. Such represents undue experimentation.

Claim Rejections - 35 USC § 112, 2nd Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 16-19 remain rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, as set forth in the previous Office Action.

Response to Applicant's Arguments

Applicant argues that "it is unclear why the method and probe must distinguish between DNA and RNA for the present invention to be enabled. The claims are directed to detecting a highly ordered structural site using a probe, not distinguishing between RNA and DNA.

In response, the Examiner contends that, in fact, this was not stated in the previous Office Action and the issue in the enablement rejection, as re-stated above, was one of whether the method could detect any double-stranded DNA or any RNA. Specifically, as pointed out, the specification does not provide guidance on how to distinguish between double stranded DNA, "normal" single stranded DNA, or a "highly ordered structural site" of a single stranded nucleic acid. This is still the case, as the claims have not been amended to reflect what Applicant believes is his/her invention. The specification clearly states that "the invention relates to a probe for detecting a highly ordered structural site of a **single stranded nucleic acid** of a gene, a method for detecting the same using a probe, and a device for detecting the same (page 1, lines 6-8)". The specification is only enabling for single stranded structures.

The specification goes on to say that "a highly ordered structural site of a single stranded nucleic acid is a region located in a part of a high-ordered structure of a DNA or RNA where the bases of the single stranded nucleic acids are not stacked, the region including a mismatch structure of an oncogenic DNA, a hairpin structure of a viral RNA, and a bulge (page 1, lines 16-

20). Applicant contends that this is a definition of "a highly ordered structural site". However, the circular definition provided in the specification fails to provide a meaning such that one of skill in the art would be appraised of the exact structure of a "highly ordered site".

Applicant has provided additional technical data, however this is not persuasive as the definition in the specification for "highly ordered" structural sites, provided above, relates to single stranded regions. The data provided relates to double stranded regions.

Applicant is further reminded that the claims must be enabled at the time of filing and any showing of such must include proper evidence.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

No claims are allowed.

Inquiries

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the PTO Fax Center located in Crystal Mall 1. The faxing of such papers must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and

1157 OG 94 (December 28, 1993) (See 37 CFR § 1.6(d)). The CM1 Fax Center Number is (703) 872-9306.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lori A. Clow, Ph.D., whose telephone number is (571) 272-0715. The examiner can normally be reached on Monday-Friday from 10 am to 6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael P. Woodward, Ph.D., can be reached on (571) 272-0722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

MARJORIE MORAN
PATENT EXAMINER
10/14/04

October 12, 2004
Lori A. Clow, Ph.D.
Art Unit 1631
Lori A. Clow